



John F. Kennedy Space Center's Nondestructive Inspection and Evaluation of Corrosion Under Paint



BENEFITS

- Enables inspection for corrosion without having to remove paint or other materials from the surface
- Works fast—inspects at a rate of 15 seconds per square inch
- Uses low power—less than 5 W
- Yields few false positives compared to current commercial inspection units
- Works on steel and aluminum materials to detect corrosion under paint or insulation
- Works on large structures and pipeline-type structures, including cryogenic lines
- Reduces maintenance costs

The National Aeronautics and Space Administration (NASA) seeks partners interested in the commercial application of the Nondestructive Inspection and Evaluation of Corrosion Under Paint. Engineers at Kennedy Space Center (KSC) developed a new nondestructive evaluation/inspection technique based upon millimeter wavelength scanning signals useful for detecting corrosion hidden under paint on steel and aluminum structures, such as those found at NASA's launch pads. The technique was successfully tested in the laboratory environment. The technology is capable of detecting corrosion over areas smaller than 0.25 square inch through paint or thermal protection material in excess of 0.008 inches up to thicknesses exceeding 12 inches.

opportunity

APPLICATIONS

- Navy and Commercial Cruise Ships
- Airplanes and Aerospace Vehicles
- Communication Towers
- Bridges and Tunnels
- Tanks, Water Towers and other containers
- Insulated Pipelines

TECHNOLOGY STATUS

- ☒ Patent pending
- ☐ U.S. patent
- ☐ Copyrighted
- ☒ Available to license
- ☐ Available for no-cost transfer
- ☐ Seeking industry partner for further codevelopment

Paint can obscure corrosion, forcing the sandblasting of protected surfaces simply to discover that there is little to no corrosion present under layers of paint. It then becomes necessary to repaint the sandblasted structure. This is a problem especially with launch towers, bridges, and other steel structures. It can also be a problem with painted aluminum structures.

Technology Details

Device components include two frequency sources that produce two signals set to the same general microwave band, but at slightly separated frequencies. The two signals are combined in a two-way power combiner and fed through a four-port, two-way direction coupler and into the dielectric lens antenna aimed at the metal surface. The component costs are expected to be in the \$30K range in production quantities.

The mode of operation is to scan a painted metallic surface, using two signals simultaneously, to sense the presence of passive intermodulation products. A dielectric lens antenna focuses energy onto a 1-inch-diameter spot, increasing the incident millimeter wave power levels to the point of producing passive intermodulation products when corrosion is present.

Maintaining painted steel and aluminum structures costs each NASA Center millions of dollars per year. With this technology fully developed, it may be possible to reduce the cost of maintenance with regards to corrosion through exploiting the ability to determine when painted structures need to be sandblasted or otherwise cleaned, and repainted, on a longer recurring schedule than presently used.

Partnership Opportunities

NASA has applied for a U.S. patent on the Nondestructive Inspection and Evaluation of Corrosion Under Paint technology, and is seeking licensees of the patent. All NASA licenses are individually negotiated with the prospective licensee, and each license contains terms concerning commercialization (practical application), license duration, royalties, and periodic reporting. NASA patent licenses may be exclusive, partially exclusive, or nonexclusive. If your company is interested in the new Nondestructive Inspection and Evaluation of Corrosion Under Paint technology, or if you desire additional information, please reference Case Number KSC-13480 and contact:

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